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NORTHEASTERN RESEARCH NOTES

NORTHEASTERN FOREST EXPERIMENT STATION

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HOW MANY TREES
ARE DESTROYED IN LOGGING?

Damage to standing timber is accepted as a normal result of logging operations. The extent of such logging damage has not been established for the Appalachian Mountain region.

If the forest manager knew the extent of damage from different intensities of cutting, he would be better able to maintain a fixed growing stock. He could allow for the amount and distribution of expected damage and compensate for it.

A preliminary study was made on three experimental logging jobs on the Fernow Experimental Forest in West Virginia, to determine the amount and distribution of logging damage.

This area is typical of several million acres in the Appalachian Mountain region. The

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stands are a mixture of old residuals with large crowns and young pole-size trees with small crowns. Topography is varied, with an average slope of about 30 percent. Elevations range from 2,200 to 2,680 feet. The history of the area is one of clear-cutting, followed by severe fire, then Federal acquisition and protection. Now cove hardwoods predominate in the coves and lower slopes, and mixed oaks on the ridges.

A Study Of Logging Damage

Three intensities of cutting were used. Two were partial cuttings, to 16-inch and 14-inch diameter limits, removing respectively about 47% and 50% of the stand volume (trees 5 inches dbh and larger). In addition, some smaller trees were taken out as thinnings. The third was a straight 8-inch diameter-limit cutting--practically a clear-cutting. About 85% of the stand volume was removed.

Cutting was done with a power saw, by an experienced 2-man crew that had been trained to use care in felling. Cull trees were girdled or poisoned. Damage to the residual stand probably would have been greater if these large culls had been felled.

The felled trees were skidded out in tree lengths, through natural openings to skid trails. A logging arch was used in skidding. This helped to control movement of the stems and so minimized damage to smaller trees.

Damage considered in this study was complete destruction of the tree (immediate destruction or wounding so that death was certain).

Results

Though based on only three logging jobs, varying in size from 46 to 59 acres, the results indicate that damage to the residual stand need not be a deterrent to partial cutting--even in this region of difficult logging (tables 1 and 2).

Table 1.--Logging damage to residual trees, by diameters

D.b.h. (inches)	Trees destroyed by--					
	16-inch diameter cutting		14-inch diameter cutting		8-inch diameter cutting	
	Total	Per acre	Total	Per acre	Total	Per acre
	Number	Number	Number	Number	Number	Number
5	120	2.03	69	1.49	131	2.49
6	98	1.66	86	1.87	85	1.62
7	56	.95	33	.71	37	.70
8	25	.42	38	.82	29	.55
9	16	.27	30	.65	--	--
10	10	.17	21	.45	--	--
11	12	.20	14	.30	--	--
12	3	.05	7	.15	--	--
13	6	.10	4	.09	--	--
14	10	.17	2	.04	--	--
15	7	.12	--	--	--	--
16	3	.05	--	--	--	--

Only 3 to 5 trees per 100 of those to be left (5 inches dbh and larger) were lost to logging damage. These losses are so relatively small that only under very intensive management would they have to be compensated for in marking for the cut.

The volume damaged was also small: 0.5% to 1.6% of the original stand volume. The trees lost were well scattered over the selectively

Table 2.--Summary of logging damage

Item	16-inch diameter cutting	14-inch diameter cutting	8-inch diameter cutting
Number of trees damaged:			
Total number	366	304	282
Number per acre	6.19	6.57	5.36
Percent of residual stand	3.8	3.6	4.9
Volume of trees damaged:			
Percent of residual stand	2.9	3.2	3.6
Percent of original stand	1.5	1.6	0.5

cut areas, and the losses did not make undesirable holes in the forest cover.

(No record was kept of trees damaged but expected to live, nor of trees less than 5 inches dbh.)

Damage in the partially cut stands will probably be lower in future cuts. This first cut removed the larger trees, remnants of the original stand. Despite careful felling, they damaged the second-growth stand. Once these big holdovers are removed, there should be less damage in future cuts, when the trees will have more compact crowns.

--SIDNEY WEITZMAN and CARL J. HOLCOMB